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ABSTRACT

A new curricular approach called Entrepreneurs in Action! was developed to encourage development of entrepreneurial thinking, including thinking "outside of a structured setting" and demonstrating creativity in problem solving. The effects of the Entrepreneurs in Action! program on the development of entrepreneurial thinking among elementary, middle, and high school students were evaluated in a study in which 187 students were divided into an experimental group that completed the program (117 students) and a control group (70 students) that did not. Both groups completed pretest/posttest instruments, a demographic survey, and student questionnaire. Data were also collected through a teacher survey and in-class observations. The various data collection instruments were designed to evaluate students' progress in relation to the following categories of entrepreneurial behavior: demonstrates entrepreneurial thinking; considers financial factors; thinks in terms of unifying theme; conducts industry analysis; presents a conception new product/service in a clear, well-developed manner; and considers market research. The study established that, compared with the control group, the experimental group made significant gains on the posttest as a whole and in the key category of entrepreneurial thinking. The types of work products produced by the students in the experimental group exhibited creativity, innovation, and understanding. (Nine tables/figures are included. The bibliography lists 14 references.) (MN)

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ED 477 493

ENTREPRENEURS IN ACTION: AN INTEGRATED APPROACH TO PROBLEM SOLVING VIA THE INTERNET

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R. W. Clouse

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Objectives

In the wake of the September 11 disaster, Americans found themselves asking many disturbing questions: How could such an event take place? Could it have been prevented, and can we prevent future attacks? What is the impact of these events upon our lives? These questions remain unanswered at the time of this writing. Hearings have been convened, with politicians from both major parties scrambling to provide the leadership so desperately needed during this time of national crisis. But solutions are not yet clear, and perhaps the most troubling aspect of all is that we are unable to ascertain when, or whether, there is an end in sight. To make matters worse, the stock market has plunged to levels not seen in the last five years, all in recent days. Corporate accounting fraud, recently uncovered, has led to indictments of major corporate figures. That unsettling fact, coupled with the massive bankruptcies of Enron and Worldcom, has led many to speculate upon the very stability of the U. S. economy.

Facing such a threatening horizon, we, as educators, are once again reflecting upon the futures of our students. Will they be prepared to think for themselves, to act independently, and to face a chaotic and turbulent world with a sense of purpose? Will they be adaptable and flexible, or will they see themselves as helpless victims caught up in the mad swirl of events? More to the practical point, given the increasing instability of the corporate world, will our students be able to provide for themselves? More than ever, our goal must be to prepare educational programs that will address these serious issues.

This paper reports on a new curricular approach, called *Entrepreneurs in Action!* This program is meant to encourage the development of entrepreneurial thinking, a concept described as thinking "outside of a structured setting." Such a mindset is typified

by creativity in problem solving, a skill which is increasingly important in our fast-changing economy (Clouse & Goodin, 2000). Further, this curricular approach stresses the importance of students being equipped with the skills and mindset to address problems with solutions that entail a certain emotional and intellectual risk. The ability of the student to see opportunities that others pass over and to marshal resources in the face of risk is highly valued in the new geopolitical and economic environment wrought by the 9-11 disaster and the current business crisis.

In keeping with the program's curricular goal of teaching students to "think entrepreneurially," the purpose of the study is to determine whether the learning environment advanced by the program had a positive impact on entrepreneurial thinking among students at the elementary, middle and high school levels. Four specific research questions were addressed:

1) Can students be taught to think entrepreneurially by using web-based case studies?
2) During the course of the intervention, will students show any change in the complexity of their problem-solving process?
3) What type of information will students' mentors, termed *online experts*, provide the students to help solve the case?
4) How do the students and teachers react to the curriculum?

Theoretical Framework

This study rests upon two primary conceptual supports, the broad field of entrepreneurship education and the concept of situated curricular design. Emerging

research in the field of entrepreneurship education stresses the importance of the following:

- facilitating the development of enterprising, creative, independent people,
- providing a process that helps achieve outcomes which themselves help entrepreneurs to succeed,
- using experientially–based learning models where students interact with others in the study of situations and cases designed to develop entrepreneurial skills,
- incorporating learning by doing, through "trial and error" experiences, and
- increasing students' confidence in their entrepreneurial abilities, and thus to make them more comfortable with taking risks (Rabbior, 1990).

To achieve these objectives, entrepreneurship education programs combine curricular content with independent thinking and problem solving in a business context. Students learn skills and concepts by way of practical application, and curriculum integration occurs naturally, as students see the need for those knowledge areas, such as math and social studies, which are included in the lessons. The outcome most significant to the field of entrepreneurship education, though, is that students begin to think for themselves while learning to explore and discover ideas new to them. This experience with "real-life" contexts is meant to help them become more adept at understanding complex and murky situations, generate problems relative to those scenarios, and then solve those problems effectively. The work done by Vanderbilt University's Cognition and Technology Group, on projects such as *The Adventures of Jasper Woodbury* and *Scientists in Action*, served as a model for these aspects of the *Entrepreneurs in Action!* program. In a similar approach to curriculum design, this project makes use of

instruction anchored in a context situated within the dominant subject area, in this case that of business awareness. In addition, the project makes use of a curricular model termed "whole-part-whole" instruction, wherein students experience a context-setting phase as an integral part of the instructional process (Clouse & Goodin, 2001-2002). There is support in the literature for this type of curricular approach, which is often referred to as a situated curricular design.

People generally learn new information in the context in which it is used (Brown, Collins, & Duguid, 1989). This suggests that students may be drilled to the point that they will be able to do well on a test, but that they will not retain the knowledge over time or be able to apply it elsewhere (Bransford, J. D., Brown, A. L. & Cocking, R. R., 1999). According to the concept of situated cognition, it is imperative to provide students with contextual practice in order to insure that they really "know" a concept. Knowledge that is unused (in context) quickly becomes "inert" and is no longer available to the learner. To use the example of the middle school math class, the students may very well learn how to work the percentages formula on the board and on the test, but they will not know how to calculate a margin of profit in real life!

In order to bridge this gap between traditional classroom learning and real–world applications, educators must present concepts within a situational, reality–based context (Lampert, 1986). In fact, true learning, according to Brown, Collins and Duguid, requires the adoption of the domain's culture. In order to solve mathematical problems, one must learn to be "a mathematician." To be a mathematician involves more than just learning formulas from the blackboard. A student must adopt the culture of the mathematician, to a certain extent. One way to immerse them in the culture of a domain is for teachers to

employ the idea of cognitive apprenticeships. Modeled after the craft apprenticeships, this approach allows students to use knowledge in ways that match how they would use it in a practical, or "authentic," setting. For example, if students learn mathematics in authentic settings, such as in setting up a business, they are more likely to begin thinking "like a mathematician," or to see the world the way a mathematician would see it. In addition, Brown, Collins, and Duguid argue that there is a transfer of creative problem-solving ability, in that students will begin to solve other problems "mathematically."

Methods

The study explored the effects of the *Entrepreneurs in Action!* program on the development of entrepreneurial thinking among elementary, middle and high school students who participated in the project. As part of this evaluation, the elements of the curriculum were examined for usage and effectiveness in an effort to improve the program for future use in classrooms. This approach yields insight into both the product and process associated with the program. A mixed method design was employed for this study. For the quantitative phase, a two-group, quasi-experimental model was employed, and a pattern coding method was used for the qualitative analysis phase (Fetterman, 1998). At each level, students from two classrooms were divided into experimental and control groups, with a total of 187 students in the project. The experimental group was composed of 117 students and the balance of 70 students formed the control group. The experimental group received the intervention, while the control group did not. Both groups took pre- and posttests. The scores from the control group were intended to establish a baseline for comparison of any gains made by the experimental group during the course of the program. These outputs of the program are presented, along with

qualitative information meant to fill in the details and shed light on the causes for the observed results.

Data Sources

For the purpose of judging the students' essay responses, entrepreneurial behaviors were organized into six categories and were included in the design of a rubric created to measure the pre- and posttest essays (See Figure 1). In addition, the rubric categories were weighted to reflect the fact that entrepreneurial thinking is not only a separate category but is also represented to a lesser degree in several of the other categories as well. The result was a rubric that allotted 20 points to content knowledge and 20 points to entrepreneurial thinking (See Figure 2).

Before its use, the rubric was evaluated by a group of university professors, educators and entrepreneurs and was judged to have content validity. In order to ensure reliability, two teachers were asked to independently rate a random selection of the pre and posttests. A 10% random selection was drawn from the initial pool of essays, which came from the middle school study. These rated essays, representing a cross-section of both experimental and control groups pre and posttests, were compared to the ratings made by the principal rater of the middle school study. Inter-rater reliability was established at an average correlation of .528, which was significant at the .05 level. Thereafter, each investigator rated the tests from their own study.

In addition to the rubric, data were gathered from a demographic survey, student questionnaires, teacher questionnaires, and in-class observations. More detail was provided through the use of interviews and ratings of the students' final project presentations.

Pretest/Posttest Rubric

	Level 0 - Beginner	Level 1 - Novice	Level 2 – Utilization	Level 3 - Proficient	Level 4 - Advanced
Market Research (2)	***(0 pts)*** Target market is not identified.	(2 pts) Target Market identified, but lacks: 1) Wants or needs identified, 2) Competition, 3) Plan for Advertising and Promotion, 4) Pricing Plan	(4 pts) Target Market identified, plus 1 of: 1) Wants or needs identified, 2) Competition, 3) Plan for Advertising and Promotion, 4) Pricing Plan	(6 pts) Target Market identified, plus 2 of: 1) Wants or needs identified, 2) Competition, 3) Plan for Advertising and Promotion, 4) Pricing Plan	(8 pts) Target Market identified, plus 3 of: 1) Wants or needs identified, 2) Competition, 3) Plan for Advertising and Promotion, 4) Pricing Plan
Product or Service (2)	(0 pts) Idea is not stated.	(2 pts) Idea is vague, poorly stated and not developed. There is no evidence that the student combined knowledge in new ways or took a fresh or unexpected approach to the problem.	(4 pts) Idea is present, but not clearly stated and not well developed. There is little evidence that the student combined knowledge in new ways or took a fresh or unexpected approach.	(6 pts) Idea is clearly stated but not well developed. There is some evidence of combining knowledge in new ways and approaching the problem from a fresh or unexpected point of view.	(8 pts) Idea is clearly stated and well developed, with strong emphasis on combining knowledge in new ways and approaching the problem from a fresh or unexpected point of view.
Industry Analysis (1)	(0 pts) Factors are not listed.	(1 pt) The analysis of factors is barely mentioned, and omits a listing of special needs.	(2 pts) The analysis of factors is present but weak, and includes 1 or more of the following special needs for this type of venture: 1) equipment, 2) people 3) technology	(3 pts) The analysis of factors is present but not complete, and includes 2 or more of the following special needs for this type of venture: 1) equipment, 2) people 3) technology	(4 pts) The analysis of factors is thorough, clearly explained, and includes each of the following special needs for this type of venture: 1) equipment, 2) people 3) technology
Unifying Theme (2)	(0 pts) Purpose is not stated.	(2 pt) Some effort is made to state a purpose, but it is vague and ambiguous. The essay lacks focus and does not include: 1) A Vision statement or 2) A Mission statement	(4 pts) The purpose is presented, but is not clear and coherent, and not all parts of the essay support the purpose. The essay does not include: 1) A Vision statement or 2) A Mission statement	(6 pts) The purpose is clear and coherent, but not all parts of the essay support the purpose. The essay includes one or more of: 1) A Vision statement and 2) A Mission statement	(8 pts) The purpose is clear and coherent. All parts of the essay support the purpose. The essay includes: 1) A Vision statement and 2) A Mission statement
Financial (1)	(0 pts) Costs are not stated.	(1 pt) Description of costs is minimal, lacking major detail. It may mention, but does not explain, one or more of these: 1) Start-up costs, 2) Operational costs, and 3) Borrowing costs	(2 pts) Description of costs is present but lacks sufficient detail. It includes one or more of: 1) Start-up costs, 2) Operational costs, and 3) Borrowing costs	(3 pts) Description of costs is present, but is not thorough and complete. It needs more detail, but includes two or more of: 1) Start-up costs, 2) Operational costs, and 3) Borrowing costs.	(4 pts) Description of costs is thorough and complete, and includes a well developed discussion of each of: 1) Start-up costs, 2) Operational costs, and 3) Borrowing costs
Entrepreneurial Thinking (2)	(0 pts) Essay does not address the problem.	(2 pts) Essay lacks opportunity recognition, but includes one or more of the following: 1) Creativity, 2) Innovation, 3) Independent Thinking, 4) Risk/Reward, 5) Action Plan	(4 pts) Essay does not persuade, has major flaws, but includes two or more of the following: 1) Creativity, 2) Innovation, 3) Independent Thinking, 4) Risk/Reward, 5) Action Plan	(6 pts) Essay makes sense, but does not fully persuade. It includes three or more of the following: 1) Creativity, 2) Innovation, 3) Independent Thinking, 4) Risk/Reward, 5) Action Plan	(8 pts) Essay is persuasive, complete and coherent. The solution includes well-developed: 1) Creativity, 2) Innovation, 3) Independent Thinking, 4) Risk/Reward, 5) Action Plan
Total	**(0 pts)**	**(10 pts)**	**(20 pts)**	**(30 pts)**	**(40 pts)**

Figure 1. Analytical Rubric

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Student # _____	Levels				
Categories	**0**	**1**	**2**	**3**	**4**
Market Research (2)					
Product or Service (2)					
Industry Analysis (1)					
Unifying Theme (2)					
Financial (1)					
Entrepreneurial Thinking (2)					
Total Score Per Level					
Total Score					

Figure 2. Rubric scoring form.

Results

In order to test for a change in the level of entrepreneurial thinking among the students it was necessary to measure gain scores between the pre- and posttests in both groups while controlling for the difference in the pretests. The null hypothesis was stated as follows: There is no significant difference in the amount of entrepreneurial thinking gains by subjects within groups as reflected in pre- and posttest scores in a reflective essay test of both content knowledge and entrepreneurial thinking. This hypothesis

required separate statistical analyses for each of the six rubric elements: (a) market research, (b) product or service, (c) industry analysis, (d) unifying theme, (e) financial, and (f) entrepreneurial thinking.

Upon completion of the ratings, the results were analyzed. Because the groups varied significantly on both the pre- and the posttests, a univariate analysis of covariance was employed. This procedure allowed for testing for significant gains on each element of the rubric, while controlling for the different starting points of the experimental and control groups on the original essay. The significance test was set at an alpha level of .05. Summaries of the analyses are presented in Tables 1-3.

Table 1

Univariate Analysis of Covariance Elementary School (N=68)

		Estimated Marginal Means		
Dependent Variable	df	Exp	Control	F
Posttest	1,65	23.65	19.67	18.72**
Market Research	1,65	5.12	4.04	13.57**
Product or Service	1,65	4.51	3.90	5.07*
Industry Analysis	1,65	2.36	1.91	12.69**
Unifying Theme	1,65	4.53	3.96	7.20**
Financial	1,65	2.07	1.65	5.23*
Entrepreneurial Thinking	1,65	5.16	4.06	17.26**

* $p < .05$
** $p < .01$

Table 2

Univariate Analysis of Covariance Middle School (N=67)

		Estimated Marginal Means		
Dependent Variable	df	Exp	Control	F
Posttest	1,64	23.81	20.92	7.56**
Market Research	1,64	5.89	4.98	5.08*
Product or Service	1,64	6.48	4.91	7.21**
Industry Analysis	1,64	1.51	1.05	1.90
Unifying Theme	1,64	4.01	4.30	.65
Financial	1,64	.81	.13	6.30*
Entrepreneurial Thinking	1,64	5.30	4.03	18.68**

* $p < .05$
** $p < .01$

Table 3

Univariate Analysis of Covariance High School (N=50)

		Estimated Marginal Means		
Dependent Variable	df	Exp	Control	F
Posttest	1,47	22.03	25.19	11.23**
Market Research	1,47	3.63	4.74	8.48**
Product or Service	1,47	5.60	6.09	3.50
ndustry Analysis	1,47	1.87	1.89	.02
Unifying Theme	1,47	4.56	4.93	1.56
Financial	1,47	1.22	1.58	3.64
Entrepreneurial Thinking	1,47	5.23	5.90	4.09*

* $p < .05$
** $p < .01$

The data show that there were significant gains made by the experimental group as compared to the control group on the posttest as a whole, and in the key category of entrepreneurial thinking. The gains in this category lead to a rejection of the null hypothesis of no increase in entrepreneurial thinking.

Student entrepreneurial thinking was also judged by the types of work products that they produced. The final projects were viewed by visiting online experts, who served as panelists and judges, as well as by peers, teachers, parents and university researchers. The consensus was that the students exhibited a great deal of creativity, innovation and understanding during the presentation phase of the project. Examples of final business plans revealed a diversity of approaches to the problem scenarios. Ideas for the high school case revolved around the creation of an environmentally acceptable solution to the oil shortage crisis. Students generally created oil drilling operations that were focused upon resolving the problem while maintaining the wellbeing of the environment.

Middle school students were asked to find a suitable use for a school building that the county had decided to close. Fourteen solutions were proposed, and were broken down into categories as shown in Table 4.

Table 4

Frequencies and Percentages of Proposed Businesses in Middle School Student Final Projects (N = 14)

Category of business	*n*	%
Arts centers	4	29
Schools	3	21
Retail	3	21
Community centers	2	14
Services	2	14

Some of the proposed middle school solutions included a bed and breakfast inn, a medical clinic, an ethnic restaurant/cultural center combination, a homeless shelter,

community center, arts centers (complete with descriptions of plays, dance, painting and music services) and a shopping center. Three groups sought to have the school remain open as a school, either as a private, magnet or public enterprise.

Elementary school students in this study were to find an appropriate use for a local convenience store that had closed down. The students presented the following venture ideas in their business plan presentations.

- Sweet Stuff - Retail store selling candy, cards, toys, drinks, "slushies," lotto, cigarettes.
- Lightning Shack - Retail store selling novelties, posters, books, cards and beads to a target audience of elementary, middle and high school students.
- Claws & Paws - Pet Shop selling dogs, cats, fish, pet food, pet toys, etc. as well as grooming services, pet care, walking, and a "drop off" for unwanted pets.
- Pac Man Pizza – Pizza restaurant with a game room in the back.
- Sunrise Sunset Mart - A neighborhood convenience store with an ATM machine, bread, milk, etc.
- Steve's Mini Mart – A neighborhood convenience store.

Data on the second question are presently under analysis at the elementary and high school levels, and is complete at the middle school level. In order to measure changes in complex problem solving among participating students, 125 student questions of mentors, termed *online experts*, were accumulated for analysis. Then, a second null hypothesis was generated, which stated: There will be no change in the complexity of student thinking as reflected by their questions to the online experts during the course of the program.

To describe the nature of student thinking during the process, a modification of the protocol design used to gauge student statements in the *Jasper Woodbury* pilot was

employed (Vye, Goldman, Voss, Hmelo, Williams, & Cognition and Technology Group at Vanderbilt,1997). Student questions were then divided into four request types. Those types, along with their definitions, are as follows:

> 1. Opinion–These requests asked the expert for views, input, or feelings on a certain subject or condition. They did not seek concrete information or ask for reasons why a certain situation might exist.
> 2. Facts–Students asked online experts for descriptive information, such as costs, sizes of classrooms, numbers of students, and so forth.
> 3. Interpretation–These queries sought explanations about current realities and was often represented by "why" questions, such as the reasons why the school was scheduled to be closed.
> 4. Analysis–Students asked online experts to engage in "what if" scenarios, or to explain the effects of a case solution upon the community.

The question types were examined over the 7-day time period during which the students communicated with the online experts in order to determine if the nature of students' requests changed. Second, they were examined with an eye to the identification of emerging trends.

Day 1 of the communication period saw the students launch a volley of requests for factual information (13), followed by 7 requests for opinion. There were 4 requests for interpretation of current circumstances on that day, and no requests for analysis. On Day 2 there were 18 requests for factual information, 7 for opinion, 7 for interpretation, and 3 for analysis. Day 3 saw 14 requests for facts, 7 for interpretation, 3 for opinion, and 2 for analysis.

This pattern held steady, with factual requests consistently leading the way, until Day 4, when suddenly the students dramatically increased their requests for analysis (13 questions). On that day, the requests for analysis topped those for factual information, if by a somewhat narrow margin of 13 to 9, followed by only 2 requests for interpretation and none for opinion. At this point, electronic communication abruptly slowed, and on

Day 5 there were only 5 communications, 1 for facts, and 4 for analysis. On Day 6 there were but 2, 1 for facts and 1 for opinion. Finally, on Day 7, there were 4 requests for facts and 5 for analysis. The results of the daily analysis of student question types are shown in Table 5.

Table 5

Frequencies of Student Question Types By Day

Day	Factual	Interpretation	Opinion	Analysis	Total per day
1	13	4	7	0	24
2	18	7	7	3	35
3	14	7	3	2	26
4	9	2	0	13	24
5	1	0	0	4	5
6	1	0	1	0	2
7	4	0	0	5	9
Total	60	18	20	27	125

As Table 5 shows, students asked for more factual information than for anything else, and seemed to request facts fairly consistently throughout the short timeframe of the project's online expert communication phase. Even for this short time period, it is clear that, in each category but that of analysis, communications frequencies reached their highs on days 1 and 2, and then fell off rapidly. That fact is displayed in Figure 3.

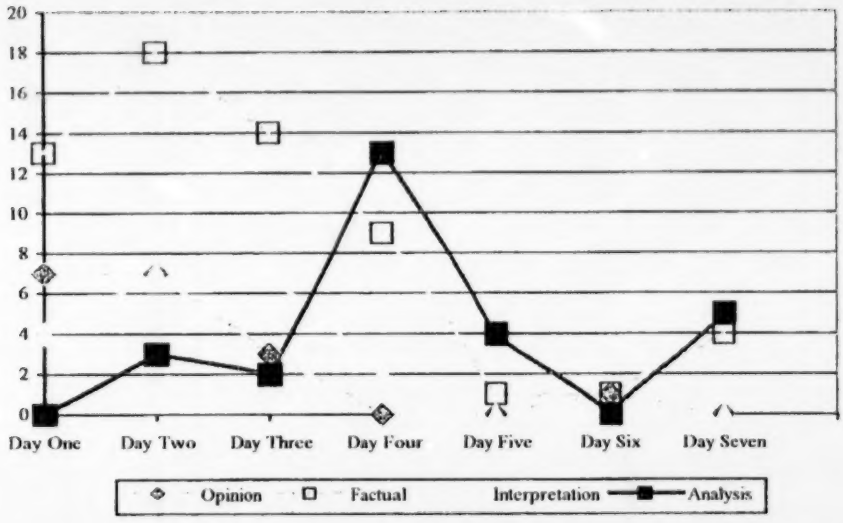

Figure 3. Graph of student question types by day.

The third research question asked: What type of information will online experts provide the students to help solve the case? In order to address this question, the responses from the online experts to the student queries were collected and subjected to a categorization process. Eight categories were used, as follows: (a) factual versus opinion (e.g., quoting statistics or saying "I think"), (b) encouraging of student creative thinking versus "giving the answers," (c) clearing up issues and questions versus raising more questions, (d) timely versus slow to respond, (e) clear and easily understood versus being ambiguous, (f) general versus specific, (g) product oriented versus process oriented, and (h) giving "too much" information versus not giving enough?

Student and teacher opinion on this question was gauged by questionnaire. Both groups reported that the online experts delivered information that was factual, specific, easily understood, and timely. Furthermore, they were deemed to clear up questions and to encourage creativity by focusing upon the students' final solutions. Experts were

considered to have given neither too much nor too little information during the course of the project.

The fourth research question asked: How do the students and teachers react to the curriculum? This question was deliberately left open-ended, so as to provide students and teachers with the opportunity to express their views and feelings concerning their experience with the program. The goal here was to allow such expression as a means of feedback leading toward programmatic improvements, in case this project is chosen for future use in these or other schools. To address the question, descriptions of program element usage are reported as percentages of class time spent. In addition, students and teachers responded to items on their respective questionnaires.

The time logs were tallied and organized to show the amount of time, as a percentage, that the students spent on the different elements of the curriculum. Analysis of these data reveals that students did, in fact, spend the majority of their time in group discussion (50%). After the group discussion, students reported that they spent the next greatest percentage of their time online, looking at and interacting with the case itself (17%). The category of my own thinking was next at 9%, followed by time spent talking with the teacher (7%). Students spent just over 5% of their time communicating with the online experts, 4% reading teacher-provided printed materials, 4% on web links from the *Entrepreneurs in Action!* web site, 1% on "other" investigations, 1% on printed materials not provided by the curriculum in some form, and 1% on the online discussion forum, which was built into the web site. These findings are summarized in Table 6.

Table 6

Percentage of Student Time Spent on Each Program Element

Element	% Time
Group discussion	50
Talking to my teacher(s)	8
My own thinking	9
Web links from the web site	4
Online experts	5
Online case (story and pictures)	17
Online discussion forum	1
Printed materials provided by my teacher(s)	4
Printed materials proved by my parent (or someone else, but not an online expert)	1
Other (please describe)	1
Total	100

Conclusions

Results of the statistical analyses, taken with the interviews and student logs, support the following conclusions:

1. The use of the *Entrepreneurs in Action!* program had a significant impact upon the learning of entrepreneurial thinking in the students involved in this study. Participating subjects at each educational level showed a significant increase in the level of their entrepreneurial thinking at the end of the study.
2. The use of the *Entrepreneurs in Action!* program had a significant impact upon the all students' content knowledge in the areas of Market Research and Entrepreneurial Thinking. In addition, elementary school students showed significant increases in all six subgroup areas, while middle school students showed increases in Product or Service Design, as well as in Market Research

and Financial. High school students showed increases in the areas of Market Research and Entrepreneurial Thinking. To a lesser extent ($p = .10$) high school students showed an increase in the Financial subgroup.

3. The use of the *Entrepreneurs in Action!* program did not produce significant changes in the middle school student levels of content knowledge in the realms of Industry Analysis or Unifying Theme, or in high school student content knowledge levels in the subgroup areas of Product or Service, Industry Analysis, Unifying Theme or Financial.
4. The numbers of student requests for complex analytical information from Online Experts increased over time during the course of the program.
5. Students felt that they had made gains in creativity and the complexity of the problem-solving process during the course of the project. They also felt that these benefits would be long-lived.
6. Teachers felt that their students had made gains in creativity and the complexity of the problem-solving process during the course of the project.
7. Online Experts added to the effectiveness of the program by giving accurate, specific and clear information in a timely manner. Furthermore, they cleared up issues and supported the problem solving process by encouraging students to think on their own.
8. *Entrepreneurs in Action!* was effective in achieving its goal of integrating so-called "traditional" subject matter like Math, Social Studies, Language Arts, Drama and Art with emerging core competencies like technology usage and presentation skills. Most of all, the program seems to have been effective at

situating learning in the framework of the students and showing that interdisciplinary teaching can be a positive and powerful instructional method.

Educational or Scientific Importance of the Study

It is important to study the effectiveness of programs like *Entrepreneurs in Action!* for four distinct reasons. First, in light of the recent attacks upon America and the aforementioned financial crisis that looms on our horizon, it is critical that we prepare students to function independently. With the growing emphasis on "lean and mean" organizations, it is important from a productivity point of view that employees have the ability to think and act autonomously for the good of the organization as a whole (Jelinek & Litterer, 1995). Business leaders are clamoring for innovative, original thinkers who can think and solve problems creatively (Drucker, 1996, p. 161). Entrepreneurship education, with its focus on independent thought, actually can help create these higher qualified employees for the American workforce. Many companies are recognizing this benefit, as is shown through their efforts to empower workers. Through such initiatives as "quality circles" and "360 degree feedback," companies are attempting to harness the creativity of their employees (Reilly, 1996; Bolman & Deal, 1997).

Second, small businesses make up the backbone of our national economy, providing almost all of the "net new jobs" (Ashmore, 1996). More people are employed by small businesses than by large organizations. It is vital to the economic well-being of the country that educators perpetuate the "American Dream" of independence through self-employment. Third, it may be argued that owning and operating a business is one way to address the issue of poverty and welfare dependency both in urban and rural settings. What better way to address this concern than to provide people with the

knowledge and skills they need to become self-sufficient? Although there are other factors that play a part, being able to hold a job (or to create one) is one important fundamental aspect of the overall solution to this national problem (Vodopivec, 1998).

Finally, by studying the effectiveness of the *Entrepreneurs in Action!* program we expand what we know about learning theory. The use of the whole-part-whole instructional model may have application across the curriculum, and not just in the field of entrepreneurship education. Further, the issue of context-based learning has come to the forefront of educational thought, as has curriculum integration. The inclusion of entrepreneurship education in the regular curriculum, with its emphasis on creativity, problem-based learning and problem solving skills, may contribute to a greater understanding of how these educational pieces can fit together in more meaningful ways.

REFERENCES

Ashmore, M. C. (1996, April). Starting at the top. *Vocational Education Journal*, pp. 35-38.

Bolman, L., & Deal, T. (1997). *Reframing organizations* (2nd ed.). San Francisco: Jossey-Bass.

Bransford, J. D., Brown, A. L., & Cocking, R. R. (Eds.). (1999). *How people learn: Brain, mind, experience, and school.* Washington, DC: National Academy Press.

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher, 18(1)*, 32-41.

Clouse, R. W. & Goodin, T. L. (2001-2002). Entrepreneurs in action: A web case model. *Journal of Educational Technology Systems, 30(3)*, pp. 311-321.

Clouse, R. W., & Goodin, T. L. (2000). *Entrepreneurs in action!* [Internet-based project and teacher's manual]. Retrieved from http://entrepreneurship.vanderbilt.edu/middle.htm

Drucker, P. (1996). *The executive in action.* New York: Harper Business.

Fetterman, D. (1998). *Ethnography: Step by step* (2nd ed.). Thousand Oaks, CA: Sage.

Jelinek, M., & Litterer, J. (1995, Spring). Toward entrepreneurial organizations: Meeting ambiguity with engagement. *Entrepreneurship Theory and Practice*, pp. 137-168.

Lampert, M. (1986). Knowing, doing, and teaching multiplication. *Cognition and Instruction, 3,* 305-342.

Rabbior, G. (1990). Elements of a successful entrepreneurship/economics/education program. In C. Kent (Ed.), *Entrepreneurship education* (pp. 53-65). New York: Quo[illegible] Books.

Reilly, R. (1996). A longitudinal study of upward feedback. *Personnel Psychology, 49*(3), 599-611.

Vodopivec, M. (1998). Turning the unemployed into entrepreneurs: An evaluation of a self-employment program in a transitional economy. *Journal of Developmental Entrepreneurship*, 3(1), 71-96.

Vye, N. J., Goldman, S. R., Voss, J. F., Hmelo, C., Williams, S., & Cognition and Technology Group at Vanderbilt. (1997). Complex mathematical problem solving by individuals and dyads. *Cognition and Instruction, 15*(4), 435-484.

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